

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-1

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2010 Survey Report

**Bachman Reservoir**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Bachman Reservoir were surveyed in 2010 using electrofishing and trap netting, and in 2011 using gill netting. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Bachman Reservoir, a 132-acre reservoir located on Bachman Branch (a tributary of the Trinity River), was constructed in 1903 by the City of Dallas for water supply. It is located in Dallas County near the Love Field Airport. Habitat was composed mainly of shoreline emergent vegetation in the form of water willow, *Justicia americana*, and bulkhead in the form of rock gabions. Bachman Reservoir was dredged in 2003 to increase depth and provide better access for boaters.
- **Management history:** Important sport fishes include largemouth bass and white crappie. All fish species have been managed by statewide regulations.
- **Fish Community**
  - **Prey species:** Electrofishing catch rates of gizzard shad were above average when compared to other district reservoirs. Threadfin shad were likely present but the population was very low in abundance. The total catch rate of bluegills was above average. Longear sunfish were also present in high abundance. Other sunfishes including green sunfish and warmouth were present in low numbers.
  - **Catfishes:** Channel catfish were present in the reservoir and the population appears to be increasing. Blue catfish were stocked in 2003 but none were captured by gill netting.
  - **White bass:** No white bass have been captured during the last three gill netting surveys.
  - **Largemouth bass:** The largemouth bass total catch rate was above average when compared to other district reservoirs. Population structure and body condition of the population were above average.
  - **White crappie:** The white crappie trap netting catch rates were well above average when compared to other district reservoirs with size structure and body conditions being above average.
- **Management Strategies:** This reservoir will be monitored with electrofishing and trap nets, in 2014 and gill netting in 2015. The reservoir has outstanding populations of largemouth bass and white crappie. These populations appear to be underutilized. Promotion of the populations, including specific fishing techniques to improve angler catch rates, will be performed using news releases. However, because of the size and location of the reservoir, over exploitation of the largemouth bass could occur if the reservoir is promoted heavily.

## INTRODUCTION

This document is a summary of fisheries data collected from Bachman Reservoir in 2010-2011. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2010-2011 data for comparison.

### *Reservoir Description*

Bachman Reservoir is a 132-acre reservoir located on Bachman Branch (a tributary of the Trinity River). The reservoir was constructed in 1903 by the City of Dallas for water supply. The reservoir is no longer used as a water supply but is used for recreation. It is located in Dallas County near the Love Field Airport. The watershed is primarily industrial with a major airport, Love Field, residing next to the reservoir. A park surrounds the reservoir and provides recreational opportunities for the citizens of Dallas. Angler bank access is excellent. However handicapped fishing access is limited. There is one boat ramp available for use but parking for boat trailers is limited. There is also a 10.5 horsepower motor restriction for boaters. The lower half of Bachman Reservoir was dredged in 2003 to increase depth and to provide better access for boaters. The upper half of the Reservoir remains very shallow and virtually inaccessible to sampling. At the time of sampling the fishery habitat was primarily shoreline emergent vegetation in the form of water willow, *Justicia Americana*, and bulkhead in the form of rock gabions. Other descriptive characteristics for Bachman Reservoir are in Table 1. Water level data is not available for the reservoir but little fluctuation of water level occurs.

### *Management History*

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Brock and Hungerford 2007) included:

Conduct baseline fish tissue sampling from selected fish to determine if there are concerns regarding fish tissue contamination

**Actions:** An initial baseline fish tissue sample was collected in fall of 2007 and analyzed by TPWD contaminants lab personnel. Fish included in the sample were largemouth bass and common carp. No contamination issues were discovered.

Request the stocking of blue catfish fingerlings at 100/acre if fish tissues analyzed were determined safe for human consumption.

**Actions:** Although no contamination issues were discovered, the stocking was not conducted. It was determined that blue catfish might not be suitable for the reservoir.

Contact Austin staff regarding development of a Bachman Reservoir information page.

**Actions:** A Bachman Reservoir information page was added to the TPWD webpage

Conduct gill net sampling at a minimum of 5 stations to determine the status of catfish populations.

**Actions:** Five gill net stations were sampled during the spring 2011 sampling season. Results are included in this report.

**Harvest regulation history:** Sport fish populations in Bachman Reservoir have been managed with statewide regulations throughout the history of the Reservoir.

**Stocking history:** Bachman Reservoir has been stocked periodically with channel catfish. Blue catfish were stocked in 2003. The complete stocking history is in Table 3.

**Vegetation/habitat history:** Bachman Reservoir habitat has remained consistent with the dominant habitat consisting of shoreline emergent vegetation in the form of water willow and bulkhead in the form of rock gabions (Brock and Hungerford 2007). Water level is stable.

**Water transfer:** Bachman Reservoir is no longer used as a drinking water supply for the City of Dallas. Thus no water is transferred into or out of the reservoir.

## METHODS

Fishes were collected by electrofishing (0.5 hours at 6 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (3 net nights at 3 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/hr) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2008). Effort of electrofishing and trap netting sampling deviated from procedures because of the small size of the reservoir.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distributions (PSD) as defined by Guy et al. (2007)], and condition indices [relative weight ( $W_r$ )] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error ( $RSE = 100 \times SE$  of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. No age and growth information was collected.

## RESULTS AND DISCUSSION

**Habitat:** The Bachman Reservoir shoreline was composed mainly of the native emergent water willow and bulkhead in the form of rock gabions. The complete habitat summary is in Table 4.

**Prey species:** No threadfin were collected in 2010. In five years of electrofishing sampling, threadfin shad were only caught during the 2006 survey (84.0/hr; Appendix C). The electrofishing catch rate of gizzard shad was 740.0/hr and was above the district average of 278.2/hr and much higher than previous samples. Index of vulnerability for gizzard shad was 97 in 2010 which was also higher than previous samples (Figure 1). The electrofishing catch rate of bluegill was 398.0/hr which was lower than the previous sample but still above the district average of 195.8/hr (Figure 2). The bluegill population does not contain large numbers of quality sized fish (>6 inches) as evident in the low PSD values. The longear sunfish catch rate was 202.0/hr in 2010 which was much higher than previous samples (Appendix C).

**Catfishes:** Even though blue catfish have been stocked, none were captured during the 2011 gill netting survey. However in other district reservoirs, it has taken blue catfish populations several years to become established and become vulnerable to sampling. Only two channel catfish were captured in the 2007 gill netting survey. In 2011 the channel catfish gill netting catch rate was 5.8/nn (Figure 4). Size distribution of the channel catfish is skewed toward adults with no sub-stock fish collected. The increase in catch rates is probably due to the annual stockings of advanced fingerlings as part of a special tank event held at the adjacent recreation center.

**Largemouth bass:** The total electrofishing catch rate of largemouth bass was 232.0/hr which was well above the district average of 132.6/hr (Figure 5). Catch rates of largemouth bass in the reservoir have historically been high. Size distribution of the population continues to be very good as reflected in PSD and PSD-P values of 57 and 27, respectively. The catch rate of largemouth bass  $\geq 14$  inches in length increased in 2010 (38.0/hr) compared to previous samples. Body conditions were excellent for nearly all size classes.

**White crappie:** The total trap netting catch rate of white crappie was very high in 2010 with a catch rate of 124.0/nn which was double the previous catch rate (Figure 6). The size structure remains above average as indicated by PSD and PSD-P values of 84 and 57, respectively. Body conditions were above 90 for most size classes (Figure 6).

**Fisheries management plan for Bachman Reservoir, Texas**

Prepared – July 2011.

**ISSUE 1:** Bachman Reservoir has a tremendous population of largemouth bass and white crappie. Fishing pressure appears to be low and the resource is underutilized.

**MANAGEMENT STRATEGY**

1. Promote the fishery through news releases.
2. Conduct several rod and reel surveys to determine best fishing methods to catch largemouth bass and white crappie and report information through news releases.

**ISSUE 2:** Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

**MANAGEMENT STRATEGIES**

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Educate the public about invasive species through the use of media and the internet.
3. Make a speaking point about invasive species when presenting to constituent and user groups.

**SAMPLING SCHEDULE JUSTIFICATION**

General monitoring of sport fish species with electrofishing, trap netting, and gill netting, will be conducted every 4 years with next sampling scheduled for 2014-2015.

## LITERATURE CITED

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.
- Brock, R. and T. Hungerford. 2007. Statewide freshwater fisheries monitoring and management program survey report for Worth Reservoir, 2006. Texas Parks and Wildlife Department, Federal Aid Report F-30-R31, Austin.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between Reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16: 888-895.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional Size Distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7):348.

Table 1. Characteristics of Bachman Reservoir, Texas.

Characteristic	Description
Year Constructed	1903
Controlling authority	City of Dallas
County	Dallas
Reservoir type	Tributary Trinity River
Conductivity	375 umhos/cm

Table 2. Harvest regulations for Bachman Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 minimum
Catfish, Flathead	5	18 minimum
Bass: White	25	10 minimum
Bass: largemouth	5	14 minimum
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 minimum



Table 3. Stocking history of Bachman Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Blue catfish	2003	13,313	AFGL	8.1
	Total	13,313		
Channel catfish	1966	6,000	AFGL	7.9
	1969	20,000	AFGL	7.9
	1976	2,000	AFGL	7.9
	1982	180	UNK	UNK
	1996	324	AFGL	11.0
	1997	400	ADL	16.0
	1998	500	ADL	11.4
	1999	400	ADL	15.2
	2000	400	AFGL	11.0
	2002	850	ADL	11.0
	2002	50	AFGL	11.0
	2004	3,807	AFGL	9.2
	2005	662	ADL	11.3
	2006	600	ADL	11.1
	2007	660	ADL	12.2
	2008	660	ADL	12.1
	2009	660	ADL	16.1
	2010	660	ADL	11.6
	2011	695	ADL	11.4
	Total	39,508		
Florida Largemouth bass	1976	5,450	FGL	3.0
	Total	5,450		
Green sunfish x redear sunfish	1976	6,000		UNK
	Total	6,000		
Largemouth bass	1967	2,500	UNK	UNK
	1976	3,000	UNK	UNK
	1982	185	UNK	UNK
	Total	5,685		
Redear sunfish	1976	6,000		UNK
	Total	6,000		

Table 4. Survey of littoral zone and physical habitat types, Bachman Reservoir, Texas, 2010. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulk head	0.6	16.7		
Native emergent	0.2	5.6		
Native emergent + flooded terrestrial	0.2	5.6		
Natural	0.3	8.3		
Natural + flooded terrestrial	0.2	5.6		
Natural + native emergent	1.6	44.0		
Rocky shoreline	0.3	8.3		
Rocky shoreline + native emergent	0.2	5.6		

## Gizzard Shad

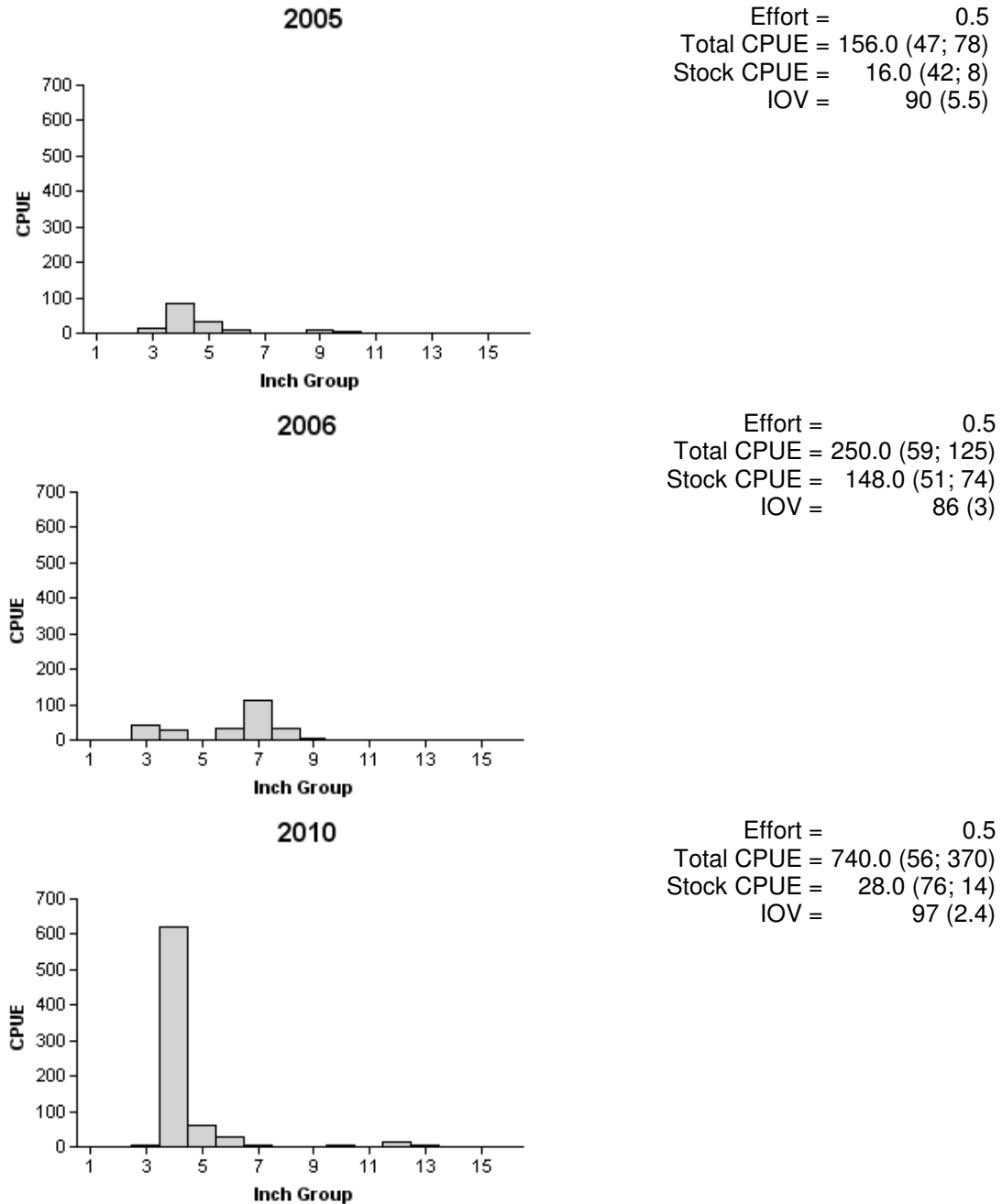


Figure 1. Number of gizzard shad caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Bachman Reservoir, Texas, 2005, 2006, and 2010.

## Bluegill

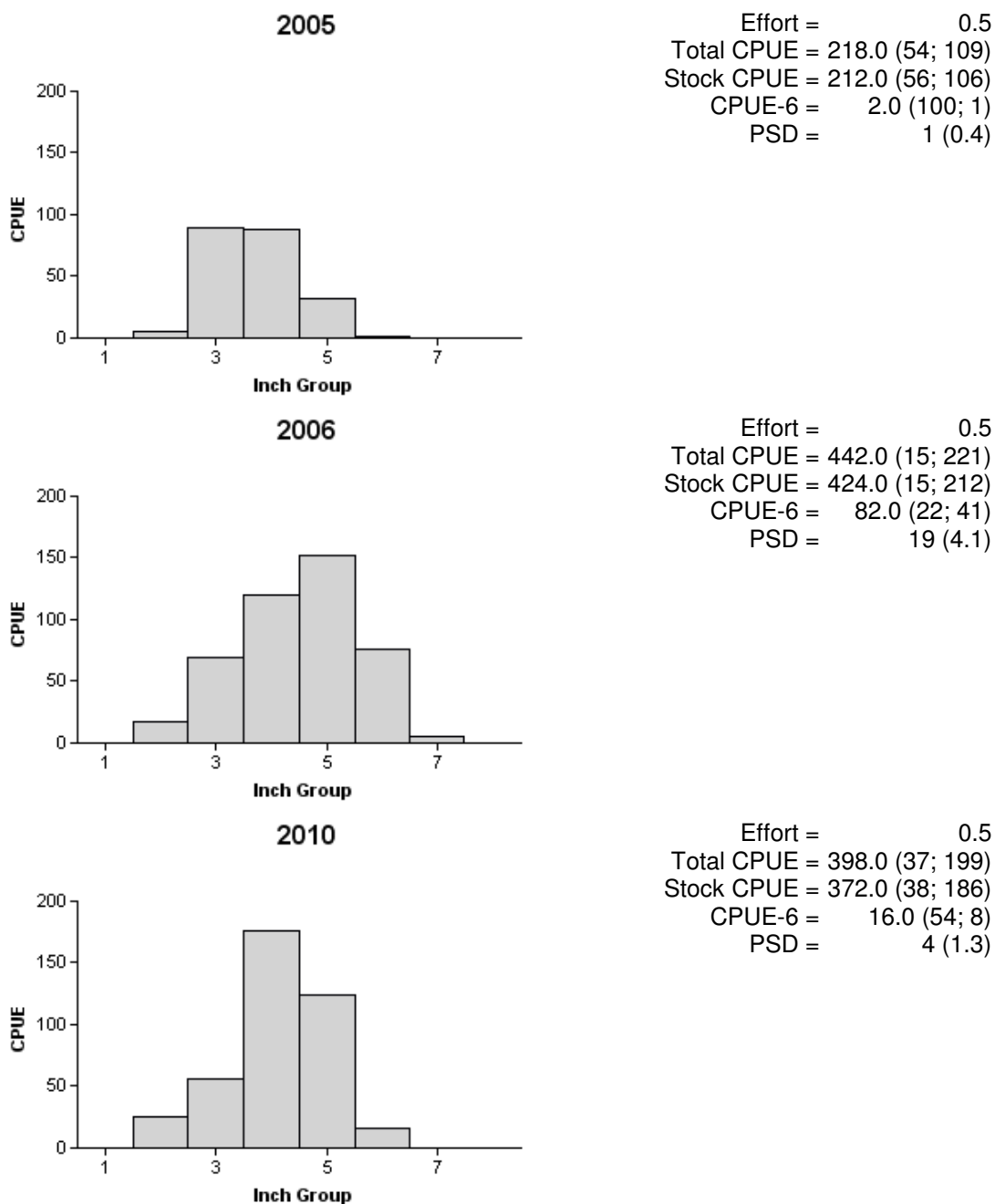


Figure 2. Number of bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Bachman Reservoir, Texas, 2005, 2006, and 2010.

## Channel Catfish

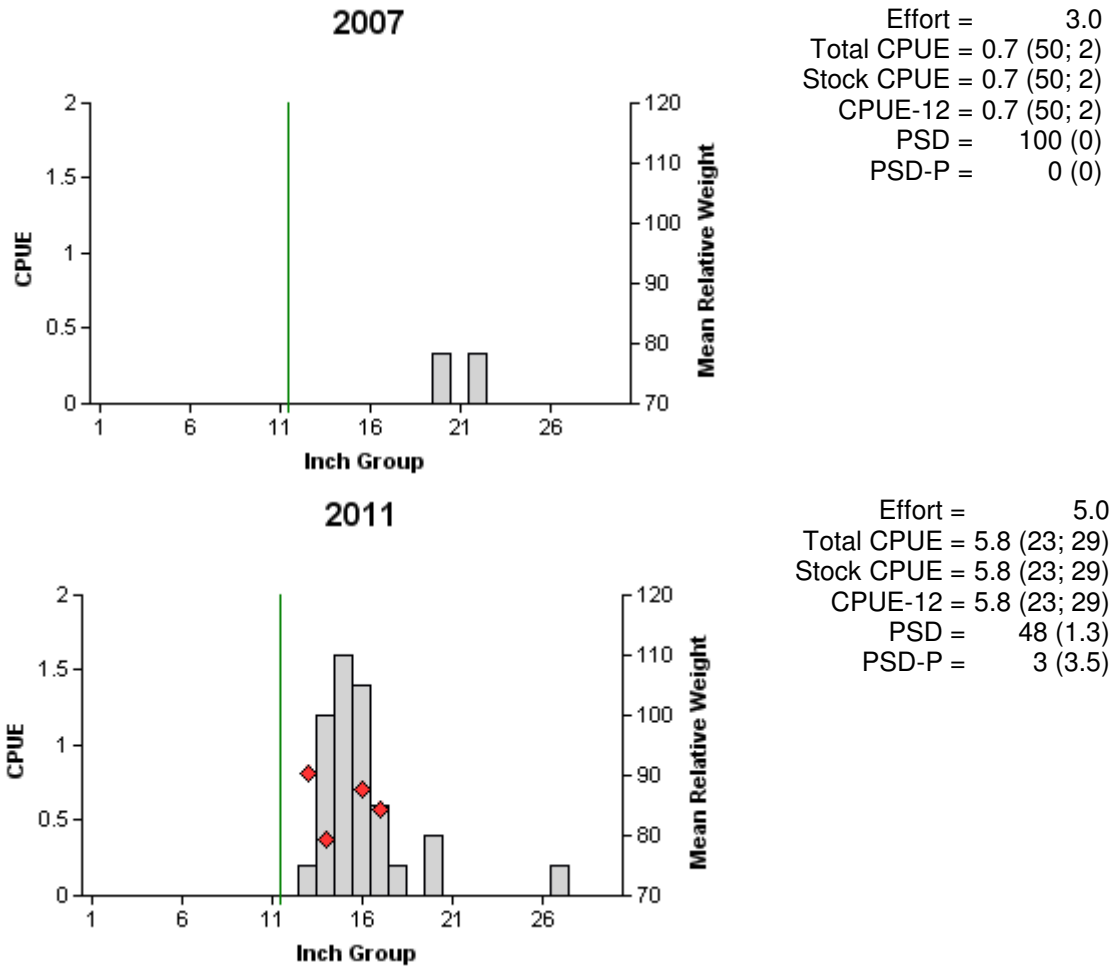


Figure 3. Number of channel catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Bachman Reservoir, Texas, 2007 and 2011. Vertical line represents length limit at time of sampling

## Largemouth Bass

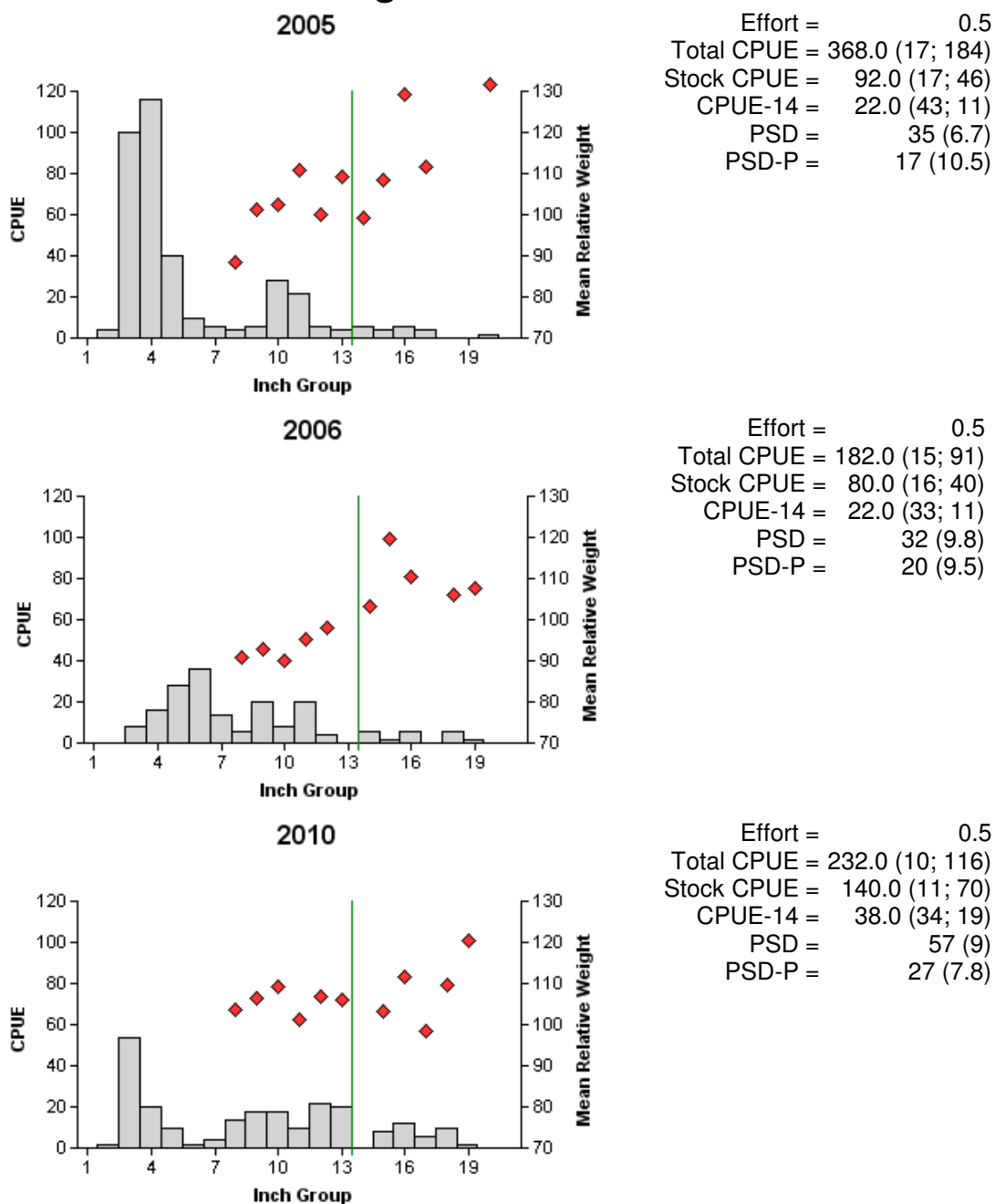


Figure 4. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Bachman Reservoir, Texas, 2005, 2006, and 2010. Vertical lines represent length limit at time of sampling.

## White Crappie

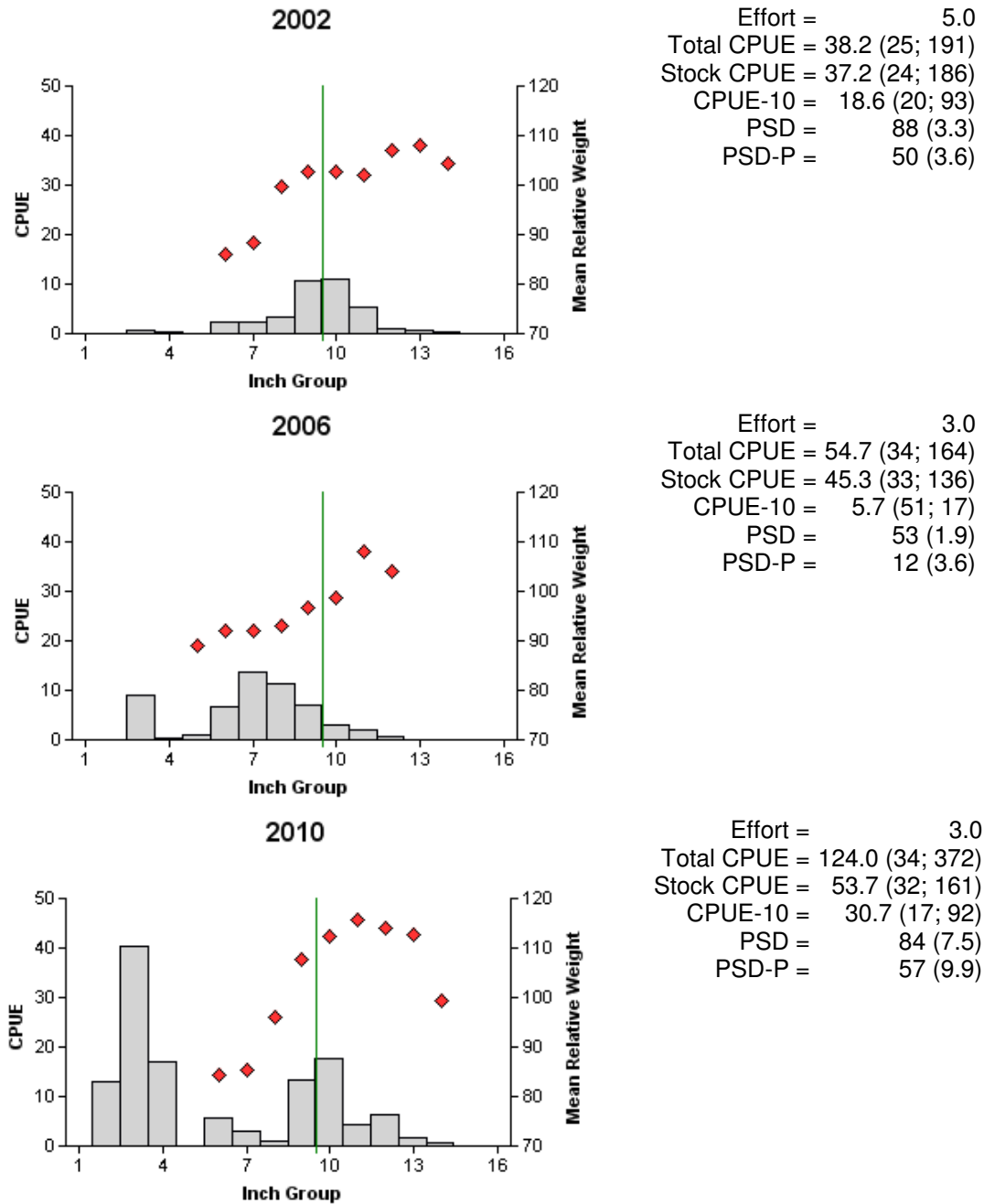


Figure 5. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Bachman Reservoir, Texas, 2002, 2006, and 2010. Vertical line represents length limit at time of sampling.

Table 5. Proposed sampling schedule for Bachman Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard surveys are denoted by S and additional surveys denoted by A.

Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Vegetation Survey	Access Survey	Report
Fall 2011-Spring 2012							
Fall 2012-Spring 2013							
Fall 2013-Spring 2014							
Fall 2014-Spring 2015	S	S	S		S	S	S

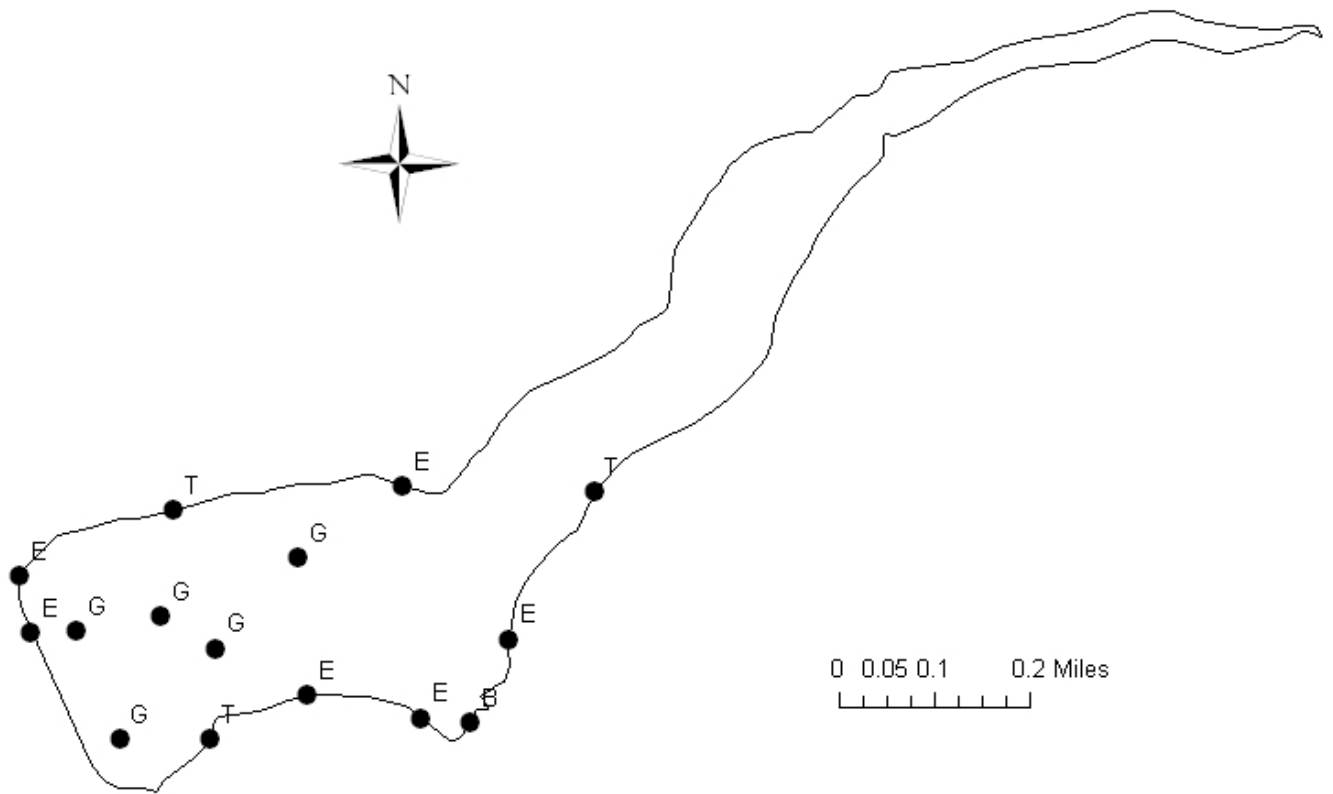


**APPENDIX A**

Number (N) and catch rate (CPUE) of species collected from all gear types from Bachman Reservoir, Texas, 2010-2011.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Spotted gar	5	1.0				
Gizzard shad	162	32.4			370	740.0
Channel catfish	29	5.8				
Bluegill					199	398.0
Longear sunfish					101	202.0
Largemouth bass					116	232.0
White crappie			372	124.0		
River carp sucker	1	0.2				
Common carp	6	1.2				

## APPENDIX B



Location of sampling sites, Bachman Reservoir, Texas, 2010-2011. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramp is indicated with a B. Water level was near full pool at time of sampling.

**APPENDIX C**

Historical catch rates of targeted species by gear type for Bachman Reservoir, Texas, 2002, 2003, 2004, 2005, 2006, 2007, 2010, and 2011.

Gear	Species	Year							
		2002	2003	2004	2005	2006	2007	2010	2011
Gill Netting (fish/net night)	Channel catfish		0.0				0.7		5.8
Electrofishing (fish/hour)	Gizzard shad	101.0	364.0	8.0	156.0	250.0		740.0	
	Threadfin shad	0.0	0.0	0.0	0.0	84.0		0.0	
	Bluegill	9.3	512.0	82.0	218.0	442.0		398.0	
	Longear sunfish	5.3	60.0	24.0	54.0	32.0		202.0	
	Largemouth bass	192.0	94.0	170.0	368.0	182.0		232.0	
Trap Netting (fish/net night)	White crappie	38.2				54.7		124.0	